PROGRAM IMPLEMENTATION PLAN
for
TOWER DATA LINK SERVICES
CIP No. 63-05
Acquisition Phase 4 (prior to DRR)

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
February 3, 1995

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A-W (HD/LR/HT/CQ/SU/TQ/NR/NA/AP/NC/NW/NN/FE/SE/TZ/TR/TM/TP/NS/OP/OS/LM/FZ)-3;
A-X (AT/AF/LG)-3; A-YZ-2; A-FAT-0 (LTD); A-FAF-0 (LTD); A-Y-2 (LTD)

FOREWORD

This Program Implementation Plan (PIP) provides technical guidance and management direction for the orderly implementation of the Tower Data Link Services (TDLS) system.

This document has been written in compliance with FAA-STD-036, Preparation of Program Implementation Plans, and identifies and describes specific requirements, events, tasks and activities to be accomplished, as well as project responsibilities that are necessary to implement the program.

Management responsibility for this program is currently assigned to Aeronautical Data Link Team, AND-310.

The goal of this PIP is to provide a uniform approach for all organizations that have a role in conducting activities necessary to implement any portion of this program.

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DOCUMENT CHANGE NOTICE

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This notice informs recipients that the standard identified by the number (and revision letter) shown in block 4 has been changed. The pages changed by this DCN (being those furnished herewith) carry the same date as the DCN. The page numbers and dates listed below in the summary of changed pages, combined with non-listed pages of the original issue of the revision shown in block 4, constitute the current version of this specification.

13. DCN No.	14. Pages changed	S*	A/D*	15. Date
	This is an initial issue.			

S* = Indicates Supersedes Earlier Pages *A = Indicates Added Page *D = Indicates Deleted Page

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1.0 GENERAL

1.1 Purpose of Document. This document serves as the Program Implementation Plan (PIP) for the Tower Data Link Services (TDLS) system and presents overall technical guidance and management direction for the orderly implementation of TDLS at the respective sites. It identifies activities and schedules required to accomplish this implementation.

1.2 Scope of Document. The PIP is applicable to all levels of the FAA with responsibility for implementing the TDLS program. It is a living document that will be updated as activities and schedules dictate.

1.3 Distribution. This PIP is distributed to the branch level offices of the members of the Integrated Product Team (IPT)For Communications to include each Associate Program Manager; to division level offices of the Associate Administrators for Air Traffic and Airway Facilities; to the division levels of the Mike Monroney Aeronautical Center and the FAA Technical Center; to the Regional Associate Program Managers; to branch level offices in the regional Airway Facilities and Air Traffic divisions; and to all Airway Facilities Sectors (AFS) offices.

1.4 Definition of Terms. The acronyms used in this PIP are defined in Appendix C. Applicable documents are listed in Appendix D.

1.5 Cancellation. Not Applicable.

1.6 Authority to Change. The Team Leader for IPT For Communications, AND-300, may issue changes to this document necessary to manage and implement the project which do not affect policy, delegate authority, or assign responsibility. ANS-200, Program Implementation Division, with the approval and concurrence of the Program Director may issue changes, updates and revisions to this document.

1.7-1.19 (Reserved)

1.20 Risk Assessment Overview. Risks are identified in each appropriate section.

2.0 PROGRAM OVERVIEW

2.1 Synopsis of Mission Need. Air Traffic Control (ATC) clearance delivery process is cumbersome, labor intensive in terms of controller voice-workload, and susceptible to human error. An improved method of ATC clearance delivery is needed. Implementation of the TDLS system will provide for needed improvements. The TDLS system is an interim system to provide services that will be replaced without loss of functionality by Tower Control Computer Complex (TCCC).

2.1.1 Operational Needs. Prior to the implementation of Pre-Departure Clearance (PDC), the Air Traffic Control (ATC) clearance delivery process was cumbersome, labor intensive in terms of controller voice-communications workload, and susceptible to human error. This is particularly true at high density facilities where upwards of 1,000 clearances are delivered daily. Also, frequency congestion with its consequent blocked and garbled communications has reached highly undesirable levels at many facilities.

TDLS will assist Airport Traffic Control Tower (ATCT) personnel in relaying departure clearances to flight crews via data link. Data link delivery of clearance messages relieves much of the voice congestion on the ATCT clearance delivery frequency by eliminating voice clearance delivery to users participating in the program.

Automatic Terminal Information Service (ATIS) is presently a continuous voice broadcast over very high frequency (VHF) air/ground (108 - 137 Megahertz) channels provided at larger terminals. It gives local weather, approach in use, departing runway, Notices to Airmen (NOTAMS) and notices of hazardous weather warnings. Pilots are encouraged to receive ATIS before requesting departure clearance, and on arrival, before contacting approach control.

Pilots have long complained of the difficulty of understanding and transcribing ATIS. Data link delivery of ATIS messages will ease the difficulty of understanding and transcribing ATIS messages and will reduce human error associated with garbled communications. TDLS will provide the capability for data link delivery of ATIS messages via the Digital Automatic Terminal Information Service (D-ATIS) with Automatic Voice Generation (AVG) application and will eliminate the difficulty of understanding the ATIS message as well as eliminate transcription errors.

In addition, D-ATIS with AVG will enable all non data link equipped aircraft to continue to receive the ATIS message over VHF, while providing the controller preparing the message with an automation tool which increases workload efficiency.

The TDLS Flight Data Input Output (FDIO) Cathode Ray Tube (CRT) and Replacement Alphanumeric Keyboard (RANK) emulation application emulates the FDIO CRT and RANK using the TDLS system. Use of the TDLS terminal will be functionally the same as the RANK/CRT pair and the PDC pair.

2.1.2 Strategic Goals. The FAA plans to upgrade the present PDC system and add 27 more facilities to this program. Maintenance of TDLS hardware will be provided under the DITCO contract. All TDLS systems will have the PDC software replaced with the new software. The TDLS system hardware will have some enhancements to better support multiple services. TDLS will provide X.25 service to ARINC Data Network Service (ADNS) via National Airspace Data Interchange Network (NADIN) Gateway. Additional memory and disk space will be added to each workstation. The current Workstation Selector Module (WSSM) will be replaced with a new unit with a Remote Control Module (RCM) in the tower cab, and a black box phone line switch. In addition to FDIO CRT/RANK

Emulation, D-ATIS with AVG will be added.

2.2 Functional Description. The TDLS system provides relief to voice communications by using digital data communications instead of voice to relay pre-departure clearances. After reviewing the flight plan and appending any local information, the clearance is transmitted from the TDLS system to participating user computers. The user will then take responsibility for delivering the clearance directly to the appropriate aircraft utilizing Aircraft Communications Addressing and Reporting System (ACARS) data link or by delivery to departure gate printers. This eliminates the need for a voice contact with the tower for clearance delivery to the flight crew. The TDLS system will communicate directly with the user operations computer to deliver clearances and will not affect in any way the FDIO system or flight strip printing in the tower cab.

The TDLS system can also be used to generate D-ATIS messages. The controller interacts with the TDLS terminal through an interface of menus and sub-menus. The TDLS system receives the Surface Aviation Observation (SAO) from the communications line of the Airport Weather Information System (AWIS), or one of the other weather systems supported. Using an editor, a controller can modify the weather information and add or modify airport information. The TDLS system compiles the ATIS text message and the computer generated ATIS voice message. The text message is sent to the D-ATIS server through FAA's X.25 service and ADNS. The flight crew can then request the ATIS message via ACARS for any of the TDLS equipped ATCTs. The ATIS voice message will be broadcast over existing ATIS frequencies.

2.3 Program History and Status. The MITRE Corporation developed an experimental tower workstation under the sponsorship of the Federal Aviation Administration (FAA) to issue clearances in digital form. The workstation was installed in three towers: Dallas/Ft. Worth (DFW), Chicago O'Hare (ORD), and San Francisco (SFO).

The first PDC system was installed in July 1989 at DFW and began operation with American Airlines as the sole participant. American uses ACARS data link as the delivery mechanism to the flight deck. All of American's DFW departures were eligible to participate, amounting to approximately 400 flights per day.

In December 1989, a second system was installed. The ORD system began operating with both American and United Airlines participating. The majority of United's fleet did not have data link displays suitable for presentation of the clearance message; therefore, a hybrid delivery system is used by United. The PDC message is received at the gate podium printer for flights not appropriately equipped to receive the message via data link. For flights with the appropriate equipment, the PDC message is accessed by the crew and displayed via a touch display input/output (I/O) device in the flight deck. All of American's and United's ORD departures were eligible to participate, amounting to approximately 700 flights per day.

Shortly thereafter both Delta and USAir also began participation. Delta did not make extensive use of data link due to limitations of the data link avionics in the fleet. Delta's approach was to deliver the PDC message via gate podium printers for all flights. Approximately 95% of USAir's fleet has data link equipment suitable for display of the PDC message. Therefore USAir uses only data link for delivery of the digital PDC message. The addition of these airlines have had the most impact at DFW, raising the number of clearances issued using PDC to approximately 600 per day.

SFO became the third PDC demonstration site in September of 1990. All four

participating air carriers operate from SFO, which uses PDC to issue more than 200 clearances per day.

Also in September 1990, the FAA embarked on a fast track National Deployment of PDC at twenty nine sites within six months. ARINC, the national deployment service provider, ported the existing software to a homogenous hardware platform that was implemented at the 29 sites. The initial three demonstration systems that had been in operation during the first year were replaced as part of the twenty-nine. The thirtieth system was deployed at Cleveland in May 1992.

Under the sponsorship of the FAA, the MITRE Corporation developed a computer workstation to assist in computer generation of ATIS messages. An eight week evaluation began January 23, 1989 at the Atlantic City International Airport. The controllers appraised the system twice during the evaluation, the first after two weeks of use and the second after the completion of the operational evaluation. Controller evaluations covered comparisons of manual and workstation procedures for generating ATIS messages, ease of use of the workstation, quality of workstation-generated digitized voice, completeness of vocabulary, and training and documentation. The operational evaluation resulted in information and ideas that were used to refine the workstation for future evaluations.

A second evaluation of the MITRE digital ATIS workstation occurred at the FAA Technical Center during February 11-13, 1992. The workstation software had been refined and enhanced to include information gathered from the previous evaluation. This evaluation did not include voice generation or pilot retrieval of the digital ATIS message, but only the workstation software as it pertained to the controller. The workstation software was evaluated by the TCCC Tower Position Console (TPC) Computer Human Interface (CHI) team. Recommendations were provided to ARINC, the national deployment service provider for the TDLS system.

The recommendations provided by the TCCC TPC CHI team were implemented in the ARINC prototype, at which time the prototype was subjected to a field evaluation at two sites, Baltimore Washington International (BWI) and Greater Pittsburgh (PIT) airports. Recommendations from the field evaluation have been incorporated in the development of the current D-ATIS application.

2.4 Program Milestones. TDLS was an internal FAA fast track Reasearch and Development (R&D) effort and did not follow normal acquisition Key Decision Point (KDP) processes. Significant program milestones are provided in Table 2-1.

Table 2-1 TDLS Program Milestones

Program Milestone	Schedule
Contract Start	9/9/94
Software Engineering Test (SET)	11/11/94-12/5/94
Development Test and Evaluation (DT&E)	1/9/95-2/10/95
Test Readiness Review (TRR)/Selloff/Acceptance Test	3/21/95-4/28/95
Operational Test and Evaluation (OT&E) Input/Output (I/O) Testing	4/24/95-5/26/95
OT&E Shakedown at IAH	5/15/95-5/19/95
Deployment Readiness Review (DRR)	6/6/95
Executive Committee (EXCOM)	6/15/95
Deployment (1st 30 Sites)	7/17/95-8/25/95
Deployment (2nd 27 Sites)	9/5/95-10/16/95

2.5 Inter-Agency Involvement. The following paragraphs describe the roles of the following organizations in the TDLS program.

2.5.1 Department of Defense (DOD). Defense Information Technology Contracting Office (DITCO), based on an interagency agreement with the FAA, has established a telecommunications contract (DCA200-90-C-0058) with ARINC to provide the FAA various telecommunications services. Those services currently include providing PDC services. When TDLS is implemented at the original 30 PDC sites, ARINC will cease providing PDC services and commence providing TDLS life-cycle Contractor Maintenance Logistics Support (CMLS) in accordance with a modification to the DITCO contract. The TDLS CMLS Statement of Work (SOW) is currently in preparation.

2.5.2 National Weather Service (NWS). Development and deployment of Automated Surface Observing System (ASOS) which the future D-ATIS application will interface with for weather information.

2.5.3 U.S. Customs Service. Not applicable.

2.5.4 Drug Enforcement Agency (DEA). Not applicable.

2.5.5 Other Agencies. Not applicable.

2.6-2.19 (Reserved)

2.20 Risk Assessment. There is moderate schedule risk associated with getting the TDLS CMLS SOW incorporated into a modification to the DITCO contract in time to support TDLS deployment currently scheduled for June 1995, time frame. Most of the TDLS CMLS SOW was lifted from the services Contract Line Item Number (CLIN) of the TDLS development, testing, and implementation contract (DTFA01-94-C-00053) during final negotiation due to funding constraints.

3.0 AIRWAY FACILITIES (AF) OPERATIONS

3.1 Summary of Maintenance Operations Impacts. The maintenance concept for the TDLS system throughout its expected 5-7 year life-cycle will be Contractor Maintenance and Logistics Support (CMLS). The primary source for life cycle maintenance support for the TDLS hardware (H/W) and software (S/W) will be ARINC. The Logistics Communications Life-Cycle Division (ALM-700) is the primary FAA interface point for the TDLS contractor maintenance system support with FAA contractor maintenance policy provided by the Program Management and Planning Division (ALM-100). (re:TDLS MRD dtd 4/23/93)

3.1.1 Transitory State. During the TDLS implementation, regional and local FAA personnel will perform the following site preparation activities:

(1) Provide guidance and assistance to ARINC during site survey activities.

(2) Establish a configuration baseline for each site which satisfies floor space, location, and power requirements.

(3) Prepare site plans and procedures necessary to receive and support the installation of the TDLS terminals.

(4) Perform site preparation as identified in the site survey report including site engineering and planning, update facility documentation, drill holes through operations floor and walls for cable routing and install AC power and grounding required to support the new equipment.

(5) Support ARINC during installation, e.g., coordinating with ARINC installation and integration activities and escorting ARINC to and from the installation site.

3.1.2 Operational State. Not Applicable

3.2 AF Procedural Changes. AF procedural changes will primarily be limited to incorporating guidance from an FDIO Site Technical Bulletin (STB) for sites with TDLS installed, which is being prepared and will be disseminated by AOS-321. This STB identifies the communications and outage coordination requirements between AF and ARINC, the TDLS CMLS provider, which needs to be incorporated into local AF procedures at each site. During installation, ARINC will also conduct a detailed AF Orientation Briefing at each site to clearly identify all TDLS demarcations with FAA equipment, to review the STB procedures, and to review what documentation their maintenance technicians will provide after maintenance visits and for material management.

3.2.1 Preventive Maintenance. ARINC shall provide on-site preventive maintenance for all TDLS systems. The TDLS system was designed with sufficient reliability to meet the requirement that no more than one preventive maintenance visit per site per quarter should be necessary.

3.2.2 Corrective Maintenance. ARINC shall provide on-site corrective maintenance for all TDLS systems. The TDLS Mean Time Between Failure (MTBF) is 2190 Hours. TDLS Mean Onsite Response Time (MORT) shall be less than or equal to 4 Hours. The TDLS Mean Time to Restore Service (MTTRS) for FDIO emulation shall be less than or equal to 30 Minutes. The TDLS MTTRS for PDC service shall be less than or equal to 4 Hours. The TDLS MTTRS for D-ATIS with AVG shall be less than or equal to 4 Hours. The TDLS D-ATIS with AVG service availability shall be greater than or equal to 95%.

The TDLS system was designed with sufficient reliability to meet the requirement that no more than one corrective maintenance visit per site per quarter should be necessary.

3.2.3 Software Maintenance. ARINC is responsible for life-cycle TDLS software maintenance which will be performed in accordance with the ARINC submitted and FAA approved Software Maintenance Plan.

3.2.4 System Operation/Monitoring. The TDLS platform has limited system operation/monitoring. ARINC uses its System Management Office (SMO) to provide 24 hour a day operational support and coordination of restoration of service interruptions for TDLS outages. ARINC receives daily health status monitoring of key TDLS equipment from each TDLS site. ARINC also receives limited automatic system alarms. As an interim system with ARINC providing CMLS throughout its life-cycle, the TDLS system does not interface with the FAA's Remote Maintenance Monitoring System (RMMS) efforts.

3.2.5 System Certification. The TDLS system has no new AF certification requirements. PDC application does not require certification. The AF technician will use existing certification of restoration of service procedures for FDIO outages after coordinating outage correction with ARINC. D-ATIS certification requirements will be supplied prior to deployment of the D-ATIS.

3.2.6 Personnel Certification. Not Applicable

3.3 Facilities and Equipment (F&E). F&E support is limited to performing site preparation as identified in the site survey report including site engineering and planning, update facility documentation, drill holes through operations floor and walls for cable routing, install AC power and grounding required to support the new equipment, and when determined, the diagnostic phone line and connectivity to ADNS via DMN, leased lines or RCL, and NADIN II.

3.4 Systems Maintenance. Systems maintenance personnel will not provide maintenance on the TDLS system. However, system maintenance personnel will be provided a detailed orientation briefing by ARINC. This briefing will culminate in reviewing the FDIO STB for TDLS sites and ensure systems maintenance personnel know (1) the TDLS interface points of demarcation with FAA equipment, (2) how to switch the TDLS primary processor to the back-up secondary processor using the Work Station Selector Module (WSSM), (3) how to enable the TDLS modem to call ARINC SMO, (4) when and how to contact ARINC SMO for TDLS corrective maintenance, and (5) what reports ARINC personnel will provide after onsite maintenance visits.

3.5-3.19 (Reserved)

3.20 Risk Assessment. The TDLS system has incorporated several changes that affect the way corrective maintenance is obtained. For security reasons, ARINC no longer has unlimited dial-in access to perform diagnostics, nor can they remotely switch processors, nor remotely download and upload software. For PDC, some towers called ARINC directly to correct outages. The AF technician will be much more involved with TDLS in coordinating ARINC's restoration of service. For example: (1) AF must enable the modem in each instance to grant ARINC remote diagnostic access to the TDLS platform. (2) AF has more TDLS interfaces to check that the problem is not emanating from the FAA side of demarcations between TDLS and FAA equipments such as FDIO, DMN, NADIN II, telco or power lines, etc. (3) AF technicians are the preferred point of contact to switch processors although with TDLS the tower AT

supervisor will also have a WSSM Remote Control Module (RCM).

The operational risks associated with TDLS from the AF perspective are being addressed by the FDIO STB and the AF Orientation Briefing in the short term, and in the long term, by having up to two AF technicians per TDLS site receive the same TDLS technician training that ARINC provides their field service technicians.

4.0 AIR TRAFFIC (AT) OPERATIONS

4.1 Summary of AT Operational Impacts. To be supplied after field shakedown.

4.1.1 Transitory State. No known impacts to AT operations due to site implementation activities.

4.1.2 Operational State. There are no functional changes in PDC or FDIO. However, there are changes in using the TDLS terminal and keyboard to display and make PDC and FDIO entries. Further, with TDLS, the AT tower personnel will have access to a TDLS WSSM RCM which will enable switching primary processors from the tower cab. Tower personnel will also be able to enable the modem to grant ARINC diagnostic access in the event AF technicians are unavailable. New TDLS sites will learn to use the TDLS terminal and keyboard to display and make PDC and FDIO entries. Voice communication with particpating PDC users will be reduced at these new sites. Impact due to ATIS operations will be supplied prior to field shakedown of D-ATIS with AVG which is planned for FY96.

4.2 AT Procedural Changes. No procedural changes will be introduced as a result of the TDLS (PDC/FDIO) deployment. Procedural changes due to ATIS service will be supplied prior to field shakedown of D-ATIS with AVG which is planned for FY96.

4.2.1 ATC Operational and Management Procedures. Not applicable.

4.2.2 Flight Procedures/Standards. Not applicable.

4.2.3 Administrative and Management Procedures. Not applicable.

4.2.4 Software Verification Procedures. Not applicable.

4.2.5 Inter-facility Procedures. Not applicable.

4.2.6 Personnel Certification Procedures. Not applicable.

4.2.7 System Back-up/Cutover Procedures. Cutover to TDLS will be accomplished during periods of light activity. Should TDLS fail to perform correctly then present FDIO and PDC systems would be returned to service.

4.3 AT Implementation. No additional AT responsibilities are associated with TDLS implementation except during test and evaluation which will be conducted at FAA Technical Center (FAATC).

4.3.1 Implementation Planning. Completion of Cadre training prior to implementation will be required.

4.3.2 Pre-Installation and Checkout (Pre-INCO). Not applicable.

4.3.3 Installation and Checkout (INCO). Not applicable.

4.3.4 System Integration. Not applicable.

4.3.5 Field Shakedown. Field Shakedown of TDLS will be conducted at Houston Intercontinental ATCT (IAH) and will involve on duty AT personnel. The site for field shakedown of D-ATIS has not been identified at this time.

4.3.6 Dual Operations. Not applicable.

4.3.7 Equipment Removal. Not applicable.

4.4-4.19 (Reserved)

4.20 Risk Assessment. No known AT operational risks are associated with TDLS implementation. The cutover at individual sites is not expected to have any impact on AT operations since cutover is planned to take place during periods of light activity.

5.0 SYSTEM CONFIGURATION AND ENGINEERING

5.1 NAS Level Architecture.

5.1.1 NAS Target State. TDLS is an interim system. TCCC will incorporate TDLS functionality.

5.1.2 Inter-program Interfaces. At present, the TDLS program is dependent on the following data transmission programs for use in the preparation and transmission of PDC service: FDIO; Data Multiplexing System (DMN); National Airspace Data Interchange Network (NADIN) II; and FAA provided telco such as Radio Communications Link (RCL), Leased Interfacility NAS Communications System (LINCS), or other leased lines.

5.2 Platform Architecture. The TDLS system is an integrated, high-availability platform designed to support applications programs for ATCTs. It provides hardware and software that accomplishes the following: Interfaces to air traffic controllers using a user-friendly Computer-Human Interface (CHI); Interfaces to the Air Route Traffic Control Center (ARTCC) computer systems over the FDIO system; supports UNIX application programs on a FAA standard computer system; Interfaces to outside communications systems through the NADIN; and Interfaces to the TDLS Message Storage and Retrieval Database provided by ARINC and located in Annapolis, Maryland, through ADNS.

5.2.2 Target State Configuration. Not Applicable.

5.3 Subsystem Level Architecture. The TDLS architecture provides a framework for the communications, data storage, operating system, and other technologies necessary to support a heterogeneous, multi-application environment. The TDLS system is structured toward the following: Provide an integrated, open system architecture for the TDLS applications, permitting lower application development and deployment costs; Allow automation of operational functions and system control functions; Provide a migratory path for known TDLS application enhancements; and Provide a common platform of system services for TDLS that can be shared by the applications. See Figure 5-1 for diagram.

5.3.1 Hardware. Equipment listed in Table 5-3 identifies minimum hardware required for each site to achieve full and minimum operational functionality. In addition DMN connectivity will be required.

5.3.2 Software. Any software installation and modifications, including the database installation, will be provided by the Contractor. All Contractor provided software is considered proprietary and will not be de-bugged or modified by on-site personnel.

5.3.3 Physical Specification. Equipment is listed in Table 5-3. Equipment listed is common to all sites.

5.4-5.19 (Reserved)

5.20 Risk Assessment. There are no known risks in the TDLS system configuration and engineering. Test and evaluation of the TDLS will provide the means to assess future risk, resolve any engineering concerns, and explore TDLS technology as it applies to FAA systems. AND-310 will identify and assess any potential risk and resolve these issues prior to the DRR EXCOM decision to deploy beyond the shakedown site (IAH).

Figure 5-1

TDLS Architecture Overview

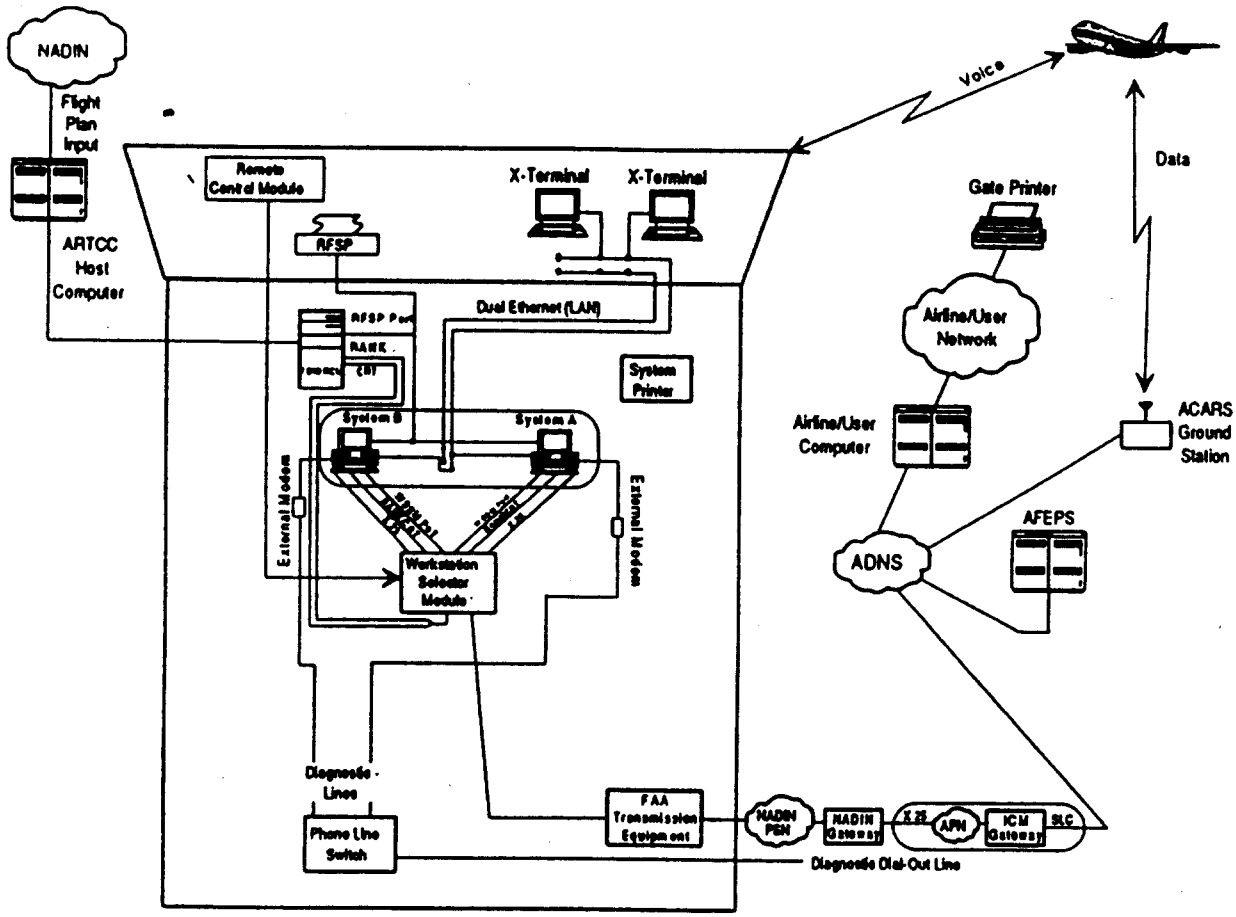

Table 5-3		
Quantity	**Equipment**	**Size**
Tower Cab 2 (SFO & DCA 3)	NCD 17c X Window Terminal	18" x 16" x 19" (H.W.D.) Weight: 48 lbs. (ea.)
2 (SFO & DCA 3)	Keyboard	2" x 19" x 8" (H.W.D.)
1	Remote Control Module	2 1/8" x 9 5/8" x 9 5/8" (H.W.D.)
Equipment Room 2	486 PC with Keyboard	Contained within Equipment Cabinet
	144 MB Internal disk drive	n/a
	540 MB unformatted internal hard disk	n/a
	DX2 66 Mhz CPU	n/a
	32 MB RAM	n/a
	250 MB cartridge tape drive	n/a
	14" Monochrome Monitor	n/a
2	16 bit 10 MHz Ethernet board	
2	9600 modem - external	n/a
	UDS 19.2 Modem (external)	n/a
2	1200 baud modem with passive listen capability - external	n/a
2	X.25 Communication Card TP4 certified	n/a
	1.75 KVA uninterruptable power supply	Contained within Equipment Cabinet
	Power Strip	n/a
	Steel frame equipment rack with front and rear key lock doors	85 7/8" x 26 1/16" x 32 3/4 " (H.W.D.) Weight: 610 lbs, (includes TDLS Equip)
2	Workstation Selector Module (WSSM)	Contained within Equipment Cabinet

Table 5-3 (cont)

Quantity	Equipment	Size
2	FDIO RCU CRT ports to PC cable (pre-run)	n/a
2	Thin ethernet cables connecting CPU to CPU to X terminal to X terminal (pre-run)	TBD at site survey
2	UNIX with X-terminal support	
	Incident report printer	Contained within Equipment Cabinet
2	RS-232 card with 8 ports	n/a
2	RS-422 card with 4 ports	n/a
4	FDIO RCU flight strip printer ports to PC cable	n/a
10	Tape cartridges	n/a
2	FDIO RCU RANK ports to PC cable (pre-run)	n/a

Table 5-3 (cont)

Quantity	Equipment	Size
Training Room		
1	Training tool - AST Premium 486/33 PC w/1.44 MB internal disk drive,170MB formatted internal hard disk, 8 MB RAM; AT&T VGA 345 CRT (or equivalent); P125 Data Shield; and keyboard	TBS
	Microsoft DOS Version 5.0 (or greater)	n/a
	DESQview/X Version 2.0	n/a
	DESQview/X Motif Window Manager Version 2.0	n/a
	TDLS Training Software Version 2.0	n/a
1	TDLS Training Tool Keyboard	2" x 19" x 8" (H.W.D.)
D-ATIS Equipment		TBD
1	Voice Synthesis Unit to ATIS Recorder Switch	TBD
1	Remote Control Module (RCM)	2 1/8" x 9 5/8" x 9 5/8" (H.W.D.)
1	VSU Channel Monitoring Unit	TBD
1	Transmitter Input Control Switch (TICS)	
1	Cable for weather data into to PC (pre-run) (D-ATIS)	TBD at site survey
1	Voice Synthesis Unit (VSU) base	TBD
	VSU Voicing Channels	n/a
1	Voice Synthesis Unit (VSU) Control Panel	TBD

Table 5-3 (cont)		
Quantity	**Equipment**	**Size**
4	VSU to CMU cables	TBD at site survey
2	VSU to TICS cables	TBD at site survey
6	PC to VSU cables	TBD at site survey

6.0 PHYSICAL FACILITIES

6.1 Real Estate. Not applicable.

6.1.1 Real Estate Requirements. No new real estate is required for TDLS implementation.

6.1.2 Real Estate Plans. Not applicable.

6.2 Heating, Ventilation and Air Conditioning (HVAC). The following subparagraphs describe HVAC requirements which will be introduced into the facilities as a result of the TDLS program.

6.2.1 HVAC Requirements. The proposed site temperature shall be one that is controlled to within 50 to 90 degrees fahrenheit. It is recommended that the site be located in an air conditioned room. The humidity should be within 40% to 60% RH (wet bulb).

6.2.2 HVAC Plans. TDLS equipment will be maintained within the environmental tolerances by the Contractor while in transit or temporary storage at the Contractor's facility. The site HVAC system is expected to be able to accommodate the small additional load, however, this will be verified with site survey.

6.3 Cables.

6.3.1 Cable Routing/Raised Floor Requirements. To be included in each site specific site survey. FAA Regional F&E personnel will be required to install cables between the tower cab (TDLS terminal location) and equipment room (TDLS equipment rack).

6.3.2 Cable Plans. To be included in each site specific site survey.

6.4 Power. The following paragraphs describe any power requirements for TDLS.

6.4.1 Power Requirements. The TDLS equipment requires essential bus power as follows:

Tower Cab	Equipment Room
115V, 1.25 AMP, 60 HZ	120V, 20 AMP, 60 HZ

6.4.2 Power Plans. The region is responsible for providing and installing all necessary equipment for the facilitation of AC power.

6.5 Physical Safety and Security. The following paragraphs describe any physical safety and security requirements as a result of the TDLS program.

6.5.1 Security and Safety Requirements. TDLS equipment should be operated and maintained in a secure environment in accordance with on-site procedures for telecommunications equipment and electrical safety guidelines for operating and maintaining electronic equipments.

6.5.2 Security and Safety Plans and Procedures. The site is responsible for providing physical security to all installed equipment. All personnel will continue to follow FAA safety procedures pertaining to telecommunications electronic equipment.

6.6 Environmental/HAZMAT. The following subparagraphs describe any environmental/HAZMAT requirements as a result of the TDLS program.

6.6.1 Environmental Monitoring Requirements. Not applicable.

6.6.2 Environmental Monitoring Plans and Procedures. Not applicable.

6.7 Grounding, Bonding, Shielding and Lightning Protection. The following subparagraphs describe any grounding, bonding, shielding and lightning protection requirements as a result of the TDLS program.

6.7.1 Grounding, Bonding, Shielding and Lightning Protection Requirements. The TDLS design will incorporate grounding and lightning protection improvements over the PDC equipment. TDLS grounding and lightning protection improvements include adding lightning suppressors on most TDLS cabling, especially those between the tower and the equipment room, and adding a grounding bar in the equipment rack for the FAA to connect to a multi-point ground.

6.7.2 Grounding, Bonding, Shielding and Lightning Protection Plans. ARINC will connect all TDLS equipment in the equipment cabinet to a grounding bar and the FAA will connect the grounding bar to a multi-point ground. ARINC will connect TDLS equipment, that is not in the equipment cabinet, to an FAA provided grounding cable, which the FAA has connected to a multi-point ground.

6.8 Space. The following subparagraphs describe any space requirements as a result of the TDLS program.

6.8.1 Space Requirements.

6.8.1.1 Existing 30 PDC Sites.

6.8.1.1.1 Tower Cab. Two TDLS X-Terminal and two TDLS keyboards will replace the existing FDIO CRT/RANK and the existing PDC terminal/keyboards in the tower cab. Typically, the X-Terminals and keyboards occupy the space vacated by the FDIO and PDC equipment. However, the TDLS keyboard is about 6 inches longer than the FDIO RANK and requires additional space. Additionally, the Remote Control Module (RCM) (dimensions: 2 1/8" x 9 5/8 " x 9 5/8" H.W.D) will be located in the tower cab and requires space. The RCM can be surface or bracket mounted on the console depending on space limitations.

6.8.1.1.2 Equipment Room. No additional space is needed. The existing PDC equipment cabinet will be repopulated with TDLS equipment.

6.8.1.2 Additional 27 TDLS Sites.

6.8.1.2.1 Tower Cab. One TDLS X-Terminal and one TDLS keyboard will replace the existing FDIO CRT/RANK in the tower cab. However, the TDLS keyboard is about 6 inches longer than the FDIO RANK and requires additonal space. Additional space in the tower cab is required for the second TDLS X-Terminal/keyboard and the RCM (dimensions: 2 1/8" x 9 5/8" x 9 5/8" H.W.D).

6.8.1.2.2 Equipment Room. Space is required for one TDLS equipment cabinet (dimensions: 85 7/8" x 26 1/16" x 32 3/4" H.W.D.).

6.8.2 Space Allocation Plans. Site surveys will be developed for each site which will also identify maintenance access.

6.9 Construction and Modification. The following subparagraphs describe any

construction and modification requirements as a result of the TDLS program.

6.9.1 Construction and Modification Requirements. No construction is required to support the TDLS system. Sites that have customized the tower cab console for the FDIO equipment)i.e., recessed keyboards, monitor stands, etc.) may require minor console modifications to accommodate the TDLS X-Terminal and keyboard due to size differences.

6.9.2 Construction and Modification Plans. Site specific requirements will be identified by ARINC in coordination with the Program Manager, the Regions, and site personnel during the site survey. The Region/site will be responsible for all tower cab console modifications.

6.10 Telecommunications.

6.10.1 Telecommunications Requirements. One diagnostic phone lines will be required for each additional TDLS site that do not currently have PDC. In addition all sites will require connectivity via DMN to NADIN II.

6.10.2 Telecommunications Plans and Procedures. Site surveys will identify requirements and the program office (AND-310) has provided installation funding to current PDC sites and will provide the same funding for additional sites.

6.11-6.19 (Reserved)

6.20 Risk Assessment. TDLS implementation schedule will be at risk if DMN is not available at each site. If DMN is not available then AOP-400 will be responsible to provide for temporary connectivity to NADIN II until DMN is fielded at the impacted site and connectivity rerouted via DMN equipment.

7.0 FINANCIAL RESOURCES

7.1 Summary of Funding Plan. AND-310 will fully fund the TDLS implementation program for FY94, and FY95, coordinate funding with DITCO for TDLS CMLS, and address future funding issues.

7.2 Facilities and Equipment (F&E) Budget.

7.2.1 F&E Budget Requirements. TDLS is fully funded to meet the planned objectives.

7.2.2 Summary of F&E Funding Status. F&E budgetary authorizations are as follows:

FY-95 - $6,700,000
FY-96 - 5,680,000
FY-97 - 1,690,000

7.3 Operations and Maintenance (O&M) Budget. All maintenace and logistics support for the TDLS system will be provided by the TDLS contractor. Projected O&M funding requirements for maintenance and logistics support of the 57 TDLS sites under the DITCO contract are as follows:

7.3.1 O&M Budget Requirements. Projected O&M funding requirements to support the DITCO contract for TDLS are as follows:

FY-95 - $3,900,000
FY-96 - 3,900,000
FY-97 - 3,800,000
FY-98 - 3,700,000
FY-99 - 3,500,000

7.3.2 Summary of O&M Funding Status. This activity is presently being negotiated between ALM, AOP, and AND.

7.4 Research, Engineering, and Development (RE&D) Budget. Not applicable.

7.4.1 RE&D Budget Requirements. Not applicable.

7.4.2 Summary of RE&D Funding Status. Not applicable.

7.5-7.19 (Reserved)

7.20 Risk Assessment. Funding is available for deployment. Funding is also available for support. There is a potential risk if the contract vehicle for support and maintenance is not agreed to.

8.0 HUMAN RESOURCES

8.1 Human Resource Management. Existing FAA policies remain in effect. The implementation of TDLS in the operational environment has no impact on the management of human resources either nationally or locally, except as noted below.

8.1.1 Impacts of Acquisition on Human Resource Management. The following subparagraphs will summarize the potential impacts of the TDLS acquisition/implementation on each of the human resource management elements once test and evaluation have been completed.

8.1.1.1 Personnel Security. ARINC will ensure compliance with the contractual security provisions which include conducting NACI background checks on all field technicians and other ARINC personnel expected to require access to restricted FAA facilities.

8.1.1.2 Relations with Local Communities. Not applicable.

8.1.1.3 Relations with Aviation Community. The TDLS program provides leading edge data link communications between the air traffic controller and air crews for PDC and the future enhancement of D-ATIS with AVG. As such, this program has high visibility in both the FAA and the aviation community and several contacts between the Airline Transportation Association (ATA) and the FAA have taken place.

8.1.1.4 Employee Work Environment. Existing FAA policies remain in effect. TDLS implementation and operation is not expected to have any impact on the employee work environment. All TDLS software is designed to be "user friendly".

8.1.1.5 Employee Job Satisfaction. Existing FAA policies remain in effect. TDLS implementation and operation is not expected to have any impact on employee job satisfaction at present PDC sites. At future sites it will reduce voice communications workload and should therefore provide more job satisfaction.

8.1.1.6 Labor-management Relations. Existing FAA policies remain in effect. TDLS implementation and deployment of D-ATIS with AVG will require Impact and Implementation (I&I) negotiation with the National Air Traffic Controllers Association (NATCA)and Professional Airways Systems Specialists (PASS). ALR-100, in coordination with ATR-100/300 and AND-310, will track and resolve any labor-management issues.

8.1.1.7 Organizational Structure(s). Existing FAA policies remain in effect. TDLS implementation and operation is not expected to have any impact on the organizational structure of individual sites.

8.1.2 Human Resource Implementation Strategies. Implementation of TDLS, including D-ATIS will involve close coordination with NATCA and other employee representation groups to assure minimum human resource impact.

8.1.3 Security Clearances. Existing policies remain in effect for gaining access to the facilities. The TDLS system has its own security procedures to prevent unauthorized access/use. The TDLS network will not be carrying classified communications traffic. Field personnel will not need security clearances to operate this equipment.

8.2 Staffing. No additional staffing is anticipated as a result of TDLS implementation. ASM-260 has issued a memorandum, Subject: DRR Staffing Issue,

Submission of: dated June 15, 1993, which states that TDLS will still use the PDC 62CA facility code according to FAA Order 1375.4. A minor modification to the class code will be required to reflect a three terminal site configuration (projected for Washington National (DCA) and San Francisco (SFO) airports.

8.2.1 Impacts of Acquisition on Staffing. Not applicable.

8.2.1.1 Operational Workload. The affected FAA work forces include the following:

8.2.1.1.1 Airway Facilities Sector (AFS) Work Force. No impacts on AFS work force staffing will be required for the TDLS sites converted from the original PDC sites. The PDC staffing standards, along with FDIO staffing standards remain in force. For this interim system, there are no current plans to revise these standards. New TDLS sites will incorporate the PDC staffing standards (about 40 Mh/year) into their AFS work force requirements. The small impact on AFS workload at the new TDLS sites is not expected to impact their manning. D-ATIS with AVG impacts will be addressed prior to deployment of D-ATIS with AVG.

8.2.1.1.2 Air Traffic (AT) Work Force. Not applicable.

8.2.1.2 Implementation Workload. The affected FAA work forces which will be involved in supporting the TDLS program implementation are listed in the following paragraphs.

8.2.1.2.1 AFS Work Force. During implementation, a site representative will act as an observer during the site survey, equipment delivery and installation, and site acceptance testing. It is anticipated that ARINC will be onsite for 2-3 days for the TDLS installation and testing.

8.2.1.2.2 AT Work Force. During implementation, a site representative will act as an observer during the site survey, equipment delivery and installation, and site acceptance testing. It is anticipated that ARINC will be onsite for 2-3 days for the TDLS installation and testing. In addition, field and headquarters AT personnel will participate in Operational Test and Evaluation conducted at the FAATC and during field shakedown testing at IAH.

8.2.1.2.3 Headquarters Work Force. The following are the headquarters work force assigned to TDLS implementation: AND-310, ACW-500, AOS-300, AOP-600, ASR-100, ATM-100, ATP-100, ATR-100, ATR-200, ATR-300, ATZ-100, ALM-700, ANS-200, ANS-300, and ALM-200.

8.2.1.2.4 FAA Technical Center (FAATC) Work Force. Following are the FAATC work force assigned to TDLS implementation: ACW-500 and AOS-321.

8.2.1.2.5 Regional Office Work Force. Following are the regional office work force assigned to TDLS implementation: The Axx-420's, Axx-450's, and Axx-510's.

8.2.2 Staffing Plans. During TDLS implementation, the staffing will not increase at any site. Any implementation activities will be performed by currently assigned personnel at each site, headquarters, FAATC, and by ARINC personnel.

8.2.3 Staffing Schedule. Not applicable.

8.3 Training.

8.3.1 Training Program. Training will be performed at each site six to eight weeks prior to deployment and operation of the TDLS system. The training concept is for ARINC to teach a cadre of FAA AT at each site, sufficiently prior to deployment, so that the FAA cadre can complete the training of remaining site AT personnel, prior to deployment and operation. TDLS training includes operator and system administrator courses. AF personnel will be provided a detailed orientation briefing and will be given the opportunity to participate in the AT training. In addition to user manuals, lesson plans, and normal course materials, the TDLS system includes a dedicated TDLS Training Tool which emulates the operator and system administrator functions in a DOS environment.

The initial TDLS PDC and FDIO CRT/RANK emulation training (1 - 2 hours per person) will be conducted at sites currently operating PDC and FDIO. As such, initial TDLS PDC and FDIO CRT/RANK emulation training will focus on the monitor and keyboard differences, and in operating these functions in a split-screen windows environment. Special attention will be given to the TDLS system redundancies and the switching of tower X-terminals and/or TDLS primary processors. In addition, initial training (4 - 5 hours per person) will be conducted at the additional 27 sites receiving TDLS PDC and FDIO CRT/RANK emulation.

Separate TDLS D-ATIS with AVG training will be conducted six to eight weeks prior to deployment of the TDLS D-ATIS with AVG application.

Finally, TDLS training will include a review of the FDIO Site Technical Bulletin (STB) for sites with TDLS installed which will be developed and disseminated separately by AOS-321. This STB will identify the FAA/TDLS points of demarcation, describe how to enable the TDLS modem to call ARINC SMO to grant them remote diagnostic access, address what happens when the FAA activates the TDLS Remote Control Module, and will clarify FAA responsibilities for notifying ARINC in the event of outages, or when the FAA's scheduled maintenance for other systems interrupts one of the input signals to the TDLS system.

Training for the present PDC sites will be validated at IAH during shakedown testing. Initial training for the 27 new sites will be validated at the FAATC February 8, 1995.

8.3.1.1 System Administration. Initial training consists of a ARINC provided formal training session, utilizing the TDLS training tool, for a cadre of TDLS System Administrators and up to two AF technicians at each site on TDLS PDC and FDIO CRT/RANK emulation. Personnel will receive supervised hands-on system introduction. Follow-on training will be conducted by the FAA cadre who received ARINC's TDLS training, using the TDLS training tool to train the remaining FAA personnel prior to TDLS implementation. A follow on class will be taught to include the System Administrator(s) functions necessary for D-ATIS with AVG prior to deployment of the D-ATIS with AVG application.

8.3.1.2 Air Traffic Personnel. Initial training consists of a formal cadre instructor training session for Air Traffic Specialist trainers for TDLS PDC and FDIO CRT/RANK emulation. Personnel will receive supervised hands-on system introduction and operation. D-ATIS system introduction and operation will be taught to AT cadre instructor personnel prior to deployment of the D-ATIS application. Follow-on training will be conducted by the facility training personnel using the Training Tool.

8.3.1.3 AF Personnel. With one exception, airway facilities personnel will not receive formal maintenance training on the TDLS system in accordance with the TDLS MRD's recognition of the TDLS as an interim program projected as CMLS throughout its 5-7 year life cycle: The one exception is that, in order to comply with FAA Order 4450.10, provisions have been made for up to two AF technicians per TDLS site will receive the same TDLS technician training that ARINC provides to their field service technicians. The schedule for this technician training will be determined after implementation and conducted during the first year of TDLS operations in accordance with the provisions of the TDLS CMLS contract.

In lieu of formal maintenance training, ARINC will provide a detailed orientation briefing during installation activities for up to two AF personnel per site. This briefing will culminate in reviewing the FDIO STB for TDLS sites and ensure AF personnel know (1) the TDLS interface points of demarcation with FAA equipment, (2) how to switch the TDLS primary processor to the back-up secondary processor using the WSSM, (3) how to enable the TDLS modem to call ARINC SMO, (4) when and how to contact ARINC SMO for TDLS corrective maintenance, and (5) what reports ARINC personnel will provide after onsite maintenance visits. Up to two AF personnel per site will also attend the TDLS System Administrator training course to obtain supervised hands-on TDLS system introduction and the knowledge of how to switch the processors and to enable the modem to call ARINC SMO. Prior to deployment of the D-ATIS application, AF personnel will similarly participate in D-ATIS System Administrator training and will receive an update to the detailed orientation briefing.

8.3.2 Training Support.

8.3.2.1 On-The-Job Training. This is the primary means of training AT tower and AF personnel. Due to simplicity of the user interface, more intensive training is unnecessary. The TDLS Training Tool can be used for refresher training without impacting the operational environment.

8.3.2.2 User Manuals. Two copies of the TDLS user manual will be provided to each Regional office Axx-450 and Axx-460. In addition, two user manuals will be provided during initial training and will be available to tower AT/AF personnel for reference. AT tower personnel will have access to the TDLS Operator User Manual (updated when D-ATIS is deployed) and AT tower personnel and AF technicians will have access to the TDLS System Administrator User Manual (updated when D-ATIS is deployed). The user manuals will describe, in detail, the functioning of the system and the measures to take in cases of exceptions.

8.3.2.3 Training Tool. A DOS based training tool will be provided to each ATCT for training purposes. Each TDLS application and the FDIO CRT/RANK emulation will be on the training tool. Documents, including a training tool user manual, specific to the training tool will be provided at each site. The training tool will be used as part of the TDLS training package.

8.3.2.4 Site Technical Bulletin. NAS Operations Division (AOS-321) is responsible for providing technical information affecting FDIO to the regions, sectors, and sites. With the addition of FDIO CRT/RANK emulation to the TDLS platform, AOS-321 is developing a FDIO Site Technical Bulletin (STB), applicable for sites with TDLS installed. This bulletin will identify circumstances requiring, and procedures for, AF personnel to communicate with ARINC. The STB also identifies all TDLS/FAA equipment interfaces and points of demarcation so AF personnel can notify ARINC prior to scheduled maintenance which would interrupt any TDLS input signals. Review of the STB will be included in the agenda for ARINC's detailed TDLS orientation briefing given to

AF personnel during TDLS installation.

8.3.3 Personnel Skills. Not applicable.

8.3.4 Training Quotas. Not applicable.

8.3.5 Training Schedule. To be supplied after field shakedown and prior to national deployment.

8.4-8.19 (Reserved)

8.20 Risk Assessment. Potential human resource risks associated with TDLS implementation include possible staff shortages preventing attendance for training and failure of I&I negotiations with employee representation organizations. One or both of these could have a serious impact on a site's ability to transition to an operational environment.

9.0 TEST AND EVALUATION (T&E)

9.1 Overview of Test Program. ACW-500 developed specific Operational Test & Evaluation(OT&E)/Integration test procedures and failure scenarios to assess the technical and operational capabilities of the TDLS system. AOS-310 is responsible for Shakedown testing. D-ATIS test procedures will be supplied prior to D-ATIS Test Readiness Review.

9.1.1 Government Test Program. The purpose of the testing program described in the TDLS Master Test Plan is to verify that the services provided to the FAA meet all technical, functional, operational, and supportability requirements, and do not interfere in any manner with other National Airspace System components.

9.1.1.1 TDLS Master Plan. ACW-500 developed a master test plan to describe the test and evaluation process that will be used to evaluate the TDLS and equipments. (RE: TDLS MTP, dtd.11/17/92)

9.1.1.2 Development Test and Evaluation (DT&E). Not applicable since this is COTS/NDI equipment.

9.1.1.3 Production Acceptance Test and Evaluation (PAT&E). Not applicable since this is COTS/NDI equipment.

9.1.1.4 Operational Test and Evaluation (OT&E)/Integration. These tests are conducted at the FAA Technical Center (FAATC) to ensure the correct operation of interfaces between the TDLS and other NAS systems. OT&E/Integration includes tests that ensure the integrity of the interfaces across the range of operational conditions expected in the field. Test areas are included that incorporate conditions beyond the range of those in ARINC's testing. Tests use both simulated and live data, and include use of actual external systems available at the FAATC. Tests are conducted using data that is representative of operational situations.

9.1.1.4.1 OT&E Operational Testing. The OT&E Operational tests are defined in Order 1810.4B and will consist of the following categories:

1. Reliability
2. Availability
3. Degraded operations
4. Stress and NAS loading
5. Human factors
6. Safety
7. Maintainability
8. Site adaptation data
9. Security
10. Transition Switchover
11. Failure Mode
12. System Effectiveness

9.1.1.5 OT&E Test and Evaluation/Shakedown. OT&E/Shakedown testing for the TDLS system will be conducted as specified by Order 1810.4B. This testing will determine the operational effectiveness of the TDLS equipment by assessing the integrated readiness of people, procedures, and equipment to assume field operational status. Testing will be accomplished at the first site. AOS-310 will stage the shakedown test for the TDLS system. ARINC will provide technical assistance, as required, to isolate and correct any technical and operational deficiencies. The tests will provide FAA personnel with first-hand operational experience on the TDLS system and permit them to identify defects or anomalies in the system operation.

1. Insofar as possible, the following will be observed during the shakedown tests: availability, safety, human factors, and any nonstandard occurrence which might be encountered in operation.

2. The shakedown testing will test the functional and operational requirements.

3. Shakedown testing will be conducted by AOS-310 and monitored by the TDLS Team Leader (AND-310), IAH ATCT AF & AT personnel, ASW-500, ASW-400, ATR-120, and ACW-500. D-ATIS shakedown participants will be supplied prior to D-ATIS shakedown.

4. AOS-310 shall be responsible for the development of the OT&E/Shakedown plan and procedures in accordance with Order 1810.4B.

9.1.1.6 Field Shakedown Testing. Subsequent to a deployment decision, it is anticipated that each system will undergo some field shakedown test & evaluation at each field site prior to commissioning. The field shakedown test will be a subset of the first site OT&E/shakedown.

9.1.2 Contractor Test Program.

9.1.2.1 Hardware Verification. A series of factory and installation tests will be performed by ARINC:

1. Pre-Shipping Factory Tests. The NCD X Window terminal will be verified by NCD before being shipped from the factory to the ARINC facilities. The standard set of quality assurance tests will be completed.

2. Post-Shipping Factory Test. The proper operation of all X Window terminals will be verified by ARINC at the ARINC facilities before installation at the tower. NCD personnel will repair or replace all non-functioning equipment.

9.1.2.2 System Checkout. ARINC will perform an equipment checkout to demonstrate that the installed equipment meets the functional performance requirements for the basic equipment and any installed options. Checkout will include the following:

1. Testing of the installed equipment to verify that integrated hardware and software meet specified functional and operational performance at each site.

2. Verifying that required support items such as support manuals are available, technically compatible and in compliance with the contract requirements.

3. Verification of the TDLS equipment installation at the site by the onsite Technical Officer Representative (TOR) when checkout has been

successfully completed and approved by the site manager.

9.1.2.3 Contractor Integration Testing. ARINC Maintenance Service (AMS) and Field Engineering (FE) personnel shall complete the installation checklist after the systems are installed to determine that all components of the system are operating properly. Integration testing will be performed at each site after installation. This will demonstrate that the TDLS equipment meets its functional and system-level performance requirements, has been integrated as specified and can interface and operate with specified external systems/subsystems. These external systems/subsystems will include the line to the FDIO RCU FSP tap, FDIO RANK and CRT connections, and the DMN connection. The expected duration of this activity should not exceed two days.

9.1.2.4 Contractor Acceptance Inspection (CAI). The TDLS equipment will be procured using a service type contract. Consequently:

1. The CAI will be performed by ARINC and the site AF personnel following site training.

2. FAA Form 256 will be used as the check list. The program office will provide a partially completed FAA Form 256s to each site.

9.2 T&E Schedule. Following is TDLS T&E schedule. D-ATIS schedule will be supplied prior to start of test and evaluation.

ACTIVITY	SCHEDULE START	SCHEDULE END
SET Testing	11/11/94	12/5/94
DT&E	9/27/94	12/9/94
Selloff/Acceptance Test	3/13/95	4/28/95
OT&E	4/24/95	5/26/95
Shakedown at IAH	5/15/95	5/19/95
EXCOM	6/15/95	6/15/95
Implementation/Deployment	7/17/95	10/16/95

9.3 T&E Responsibility Matrix. Table 9-1 describes and identifies the relevant government and ARINC individuals and organizations involved in the test program and their role and/or responsibility for the TDLS program T&E.

9.3.1 Government Test Organization. The government organizational structure that will support the conduct of government and ARINC test programs includes at least one site representative and/or TOR and a representative from AND-310 to verify ARINC test results. ACW-500 will conduct all OT&E Integration and Operational testing. AOS-310 will conduct Shakedown testing. The regions will conduct any required Field Shakedown/JAI activities.

9.3.2 Contractor Test Organization. Site Acceptance Testing (SAT) shall be conducted by ARINC. The SAT shall consist of the final phase of tests required at each site. The tests shall be conducted as a part of site installation and shall be used to verify complete functionality of the system at the receiving site. Plans and procedures for this activity shall be documented in the Site Acceptance Test Plan and Procedures to be delivered to the Contracting Officer Technical Representative (COTR) and which shall require COTR approval before acceptance. ARINC shall document the test results in the Site Acceptance Test Report and submit to the COTR for approval.

9.4 T&E Field Support Requirements. Escorts, if required for ARINC personnel by the site, will be provided by the site.

9.4.1 Personnel Requirements.

T&E Training

Event	Schedule
OT&E	4/24/95
Shakedown	3/20/95-5/14/95

1. ATR-120 will identify AT personnel needed to support OT&E and shakedown testing.

2. ACW-500 will identify FAATC personnel needed to support OT&E.

3. AOS-310 will identify FAATC personnel needed to support shakedown testing.

4. Identified IAH AT personnel will support shakedown testing.

9.4.2 Test Equipment Requirements. Not applicable.

9.4.3 System Access. Field T&E will be a subset of first site OT&E/Shakedown.

9.4.4 Space Requirements. AND-310 and AOS-310, in coordination with site personnel, will determine any space requirements required for activities. Testing will be performed with minimum disruption of current operations and maintenance activities.

9.5 T&E Program Status.

9.5.1 Test Results Summary. To be supplied after Test Readiness Review.

9.5.2 Outstanding Program Trouble Reports (PTR). There are no open critical PTR's.

9.5.3 Discrepancy Correction Process. The process for resolving test discrepancies is as follows:

1. Where possible, corrections to the TDLS software and/or hardware will be resolved by ARINC and/or AND-310 and the test repeated.

2. Any test discrepancies that are not able to be resolved in a timely manner will be noted in the Quick Look Test Report and/or Final Report. If needed, a plan of action will be agreed upon by AND-310, ACW-500, and/or AOS-310.

9.6-9.19 (Reserved)

9.20 Risk Assessment. To be supplied after OT&E.

Table 9-1 TDLS Program T&E Responsibility Matrix

Code	Responsibility
AND-310	Provide program management.
ACW-500	Conduct OT&E Integration and Operational testing.
AOS-310	Conduct Shakedown testing.
ATR-120	Support OT&E/Shakedown testing.
IAH ATCT	Shakedown site.
Regions	Conduct field shakedown/JAI activities.
ARINC	Conduct Hardware Verification, System Checkout, Contractor Integration, CAI, and SAT testing. Support OT&E/Shakedown testing.

10.0 SYSTEM SUPPORT

10.1 Implementation Support Systems. The hardware and software systems interfaces required to support the implementation of TDLS include the following:

10.1.1 Hardware. FDIO, DMN, and NADIN II. In addition one of the following weather interfaces will be required when D-ATIS is deployed: ASOS, AWIS, AWDS, or SA-IDS.

10.1.2 Software. Not applicable.

10.2 Special Support Facilities. Since TDLS is a CMLS program, special support facilities are not applicable.

10.2.1 Mike Monroney Aeronautical Center. Not applicable.

10.2.1.1 Restoration Response Level. Not applicable.

10.2.1.2 Field Level Maintenance. Not applicable.

10.2.1.3 Depot Level Maintenance. Not applicable.

10.2.1.4 Engineering Support. Not applicable.

10.2.2 FAA Technical Center. The FAATC will conduct OT&E and Field Shakedown Testing of TDLS and D-ATIS.

10.2.2.1 Restoration Response Level. Not applicable.

10.2.2.2 Field Level Maintenance. Not applicable.

10.2.2.3 Depot Level Maintenance. Not applicable.

10.2.2.4 Engineering Support. Not applicable.

10.2.3 Other Special Support Facilities. Not applicable.

10.3 Material Support.

10.3.1 Project Material. ARINC will identify in its Integrated Support Plan (ISP) and Maintenance Plan a list of recommended tools and equipment, interface devices and connectors needed to maintain the TDLS system. The ISP is planned to be completed by 2/10/95.

10.3.2 Provisions and Supply Support. ARINC is responsible for providing sufficient site and depot spares to support achievement of the required TDLS service availabilities. With the highly reliable components, robust design including many redundancies, dual tower X-terminals, and remote diagnostic capability, ARINC has minimized the need for site spares support. ARINC will distribute TDLS Line Replaceable Unit (LRU) spares throughout its field service offices in accordance with the TDLS Maintenance Plan which will be approved by the FAA. The FAA will review ARINC's proposed sparing plans for reasonableness and adequacy in achieving the required service availabilities as part of the FAA approval process of ARINC's TDLS Maintenance Plan. As a CMLS program, there is no need for a formal TDLS provisioning conference. ARINC will acquire 13 complete sets of TDLS Line Replaceable Unit's (LRU) for initial spares under the TDLS development, testing, and implementation contract (DTFA01-94-C-00053). These initial TDLS spares will be provided to

ARINC as GFE for them to administer in accordance with the material management sections of the TDLS CMLS SOW which is incorporated into the DITCO contract (DCA200-90-C-0058) with ARINC.

10.3.3 Packaging Transportation and Storage. Equipment delivered to operational sites will be preserved, packaged, and marked in accordance with ASTM-D-3951-82 as supplemented, "Standard Practices for Commercial Packaging". Equipment and support equipment delivered to the TDLS sites and ARINC maintenance centers will be preserved and packaged level "A" and packed level "B" in accordance with MIL-E-17555 "Electronic and Electrical Accessories and Provisioned Items (Repair Parts): Packaging of." Appendix F of MIL-STD-794, dated July 14, 1982, "Procedures for Packaging of Parts and Equipment" will be used as a guide in determining the standard quantity per unit container. Site spares will be preserved, packed in accordance with ASTM-D-3951-82 and marked in accordance with the supplemental requirements of ASTM-D-3951.

Electrostatic Discharge Sensitive (EDS) items will be preserved packaged and packed in accordance with EDS requirements of MIL-E-17555. ARINC will identify any TDLS equipments which involve hazardous materials and special handling in accordance with the provisions of the TDLS Services Contract.

Shipping requirements will be in accordance with best commercial practices. ARINC will apply standard commercial practices in the storage of TDLS equipments in accordance with the provisions of the TDLS services contract. Transportation of TDLS equipments will be by standard commercial practices in accordance with the provisions of the TDLS services contract.

10.4 Technical Documentation. ARINC is developing and delivering technical documentation for FAA approval in accordance with the TDLS development, testing, and implementation contract (DTFA01-94-C-00053). These technical documents will then be provided as GFP/I to ARINC to execute, maintain, and update as required throughout the TDLS life-cycle under the TDLS CMLS contract modification to the DITCO contract.

10.4.1 Hardware Documentation.

1. System/Segment Specifications (SSS) for TDLS System, for TDLS PDC application and FDIO CRT/RANK emulation, and for D-ATIS application.

2. TDLS Operator Manual.

3. TDLS System Administrator User Manual.

4. TDLS Training Tool User Manual.

5. TDLS Integrated Support Plan.

6. TDLS Maintenance Plan.

7. ARINC's TDLS H/W Installation Checklist and Field Services Training Handbook.

8. TDLS Operator Quick Reference Card.

9. TDLS System Administrator/AF Technician Quick Reference Card.

10. Test Procedures.

11. TDLS Interface Control Documents.

10.4.2 Software Documentation. TDLS software is considered proprietary. However, ARINC will submit the following:

1. TDLS Software Test Procedures
2. Software Design Document
3. TDLS Software Maintenance Plan (which includes the TDLS Software Support Transition Plan).
4. System/Segment Design Document
5. Software Requirements Specification
6. Interface Requirements Specification
7. Software Test Plan
8. Software Test Report (CSC)
9. Software Test Report (CSCI)
10. Version Description Document
11. Software Product Specification
12. Tested Source Code
13. TDLS Training Tool Source Code and Installation Disk(s)
14. Operational Build Plan

10.4.3 Procedural Documentation.

1. Conference agendas.
2. Conference minutes.
3. Project Management Plan.
4. System Test Plan.
5. System Requirements/Design Review Report.
6. Software Test Results Report.
7. Site Survey Report.
8. Acceptance Test Plan.
9. Cutover Plan.
10. Acceptance Test Report.
11. System Maintenance Plan/Procedures.
12. Integrated Support Plan
13. Configuration Management Plan

14. Quality Management Plan

10.5-10.19 (Reserved)

10.20 Risk Assessment. Any system support/integration logistics support risks associated with TDLS implementation, other than the schedule risk associated with getting the TDLS CMLS SOW on contract via DITCO as discussed in section 2.20, will be identified by ALM-700, AND-310 and the NAILSMT after field shakedown and prior to national deployment.

11.0 PROGRAM SCHEDULE INFORMATION

11.1 NAS Implementation Schedule. TDLS is an interim system to provide services that will be replaced without loss of functionality by TCCC. TDLS equipment will be delivered and installed at the site, by ARINC, per the implementation schedule listed in Table 11-1. D-ATIS schedule will be supplied prior to D-ATIS TRR.

11.2 Deployment Schedule. See Table 11-1. Specific dates for each site will be provide prior to shakedown at IAH. Installation, testing, equipment checkout, and removal of equipment is anticipated to take 2 to 3 days.

11.3 Site Implementation Schedule. Table 11-1 provides the anticipated site survey, and installation schedule for each of the sites.

11.4 Schedule Dependencies. Availability of DMN is still a risk. However, there are no other known schedule dependencies to resolve prior to implementing and testing. Approval by the DRR EXCOM to proceed is required for full deployment and implementation of the TDLS system. Field Shakedown and JAI will be dependent upon individual region and site requirements which are expected to be minimal. Transition of individual sites to the TDLS network is dependent upon AND-310, ATR-100, the regions and individual sites requirements.

11.5-11.19 (Reserved)

11.20 Risk Assessment. Potential schedule risks associated with TDLS implementation include availability of DMN, implementation personnel and decision delay by the DRR EXCOM. Coordination between the sites, the regions, ATR-100 and AND-310 will preclude scheduling conflicts with other installation activities at the sites.

Table 11-1

Site	Site Survey Start	Implementation (IOC)
Houston-Intercontinental	Completed	5/15/95
Baltimore-Washington	Completed	7/17/95-8/25/95
Washington National	Completed	7/17/95-8/25/95
Dallas-Ft.Worth	Completed	7/17/95-8/25/95
Denver	Completed	7/17/95-8/25/95
Dallas-Ft.Worth	Completed	7/17/95-8/25/95
Denver	Completed	7/17/95-8/25/95
Minneapolis-St. Paul	Completed	7/17/95-8/25/95
Boston	Completed	7/17/95-8/25/95
Las Vegas	Completed	7/17/95-8/25/95
St. Louis	Completed	7/17/95-8/25/95
Pittsburgh	Completed	7/17/95-8/25/95
La Guardia	Completed	7/17/95-8/25/95
Memphis	Completed	7/17/95-8/25/95
Seattle	Completed	7/17/95-8/25/95
Cleveland-Hopkins	Completed	7/17/95-8/25/95
Detroit-Wayne	Completed	7/17/95-8/25/95
San Francisco	Completed	7/17/95-8/25/95
Salt Lake	Completed	7/17/95-8/25/95
Raleigh-Durham	Completed	7/17/95-8/25/95
Charlotte	Completed	7/17/95-8/25/95
Orlando	Completed	7/17/95-8/25/95
Phoenix	Completed	7/17/95-8/25/95
Dulles	Completed	7/17/95-8/25/95
John F. Kennedy	Completed	7/17/95-8/25/95
Los Angeles	Completed	7/17/95-8/25/95
Miami	Completed	7/17/95-8/25/95
Newark	Completed	7/17/95-8/25/95
Philadelphia	Completed	7/17/95-8/25/95
Chicago-O'Hare	Completed	7/17/95-8/25/95
Atlanta	Completed	7/17/95-8/25/95
Nashville	Completed	7/17/95-8/25/95
Orange County	Completed	9/5/95-10/16/95
San Juan	Completed	9/5/95-10/16/95
New Orleans	Completed	9/5/95-10/16/95
Ontario	Completed	9/5/95-10/16/95
Milwaukee	Completed	9/5/95-10/16/95
Burbank	Completed	9/5/95-10/16/95
Midway	Completed	9/5/95-10/16/95
Ft. Lauderdale	Completed	9/5/95-10/16/95
Albuquerque	Completed	9/5/95-10/16/95
San Antonio	Completed	9/5/95-10/16/95
Columbus	Completed	9/5/95-10/16/95
Tampa	Completed	9/5/95-10/16/95
Oklahoma City	Completed	9/5/95-10/16/95
Sacramento Metro	Completed	9/5/95-10/16/95
Tulsa	Completed	9/5/95-10/16/95
San Jose	Completed	9/5/95-10/16/95
Indianapolis	Completed	9/5/95-10/16/95
Louisville	Completed	9/5/95-10/16/95
Austin	Completed	9/5/95-10/16/95
Oakland	Completed	9/5/95-10/16/95
Buffalo	Completed	9/5/95-10/16/95
Cincinnati	Completed	9/5/95-10/16/95

Table 11-1 (cont)

Site	Site Survey	Implementation (IOC)
San Antonio	Completed	9/5/95-10/16/95
Portland	Completed	9/5/95-10/16/95
Windsor-Locks	Completed	9/5/95-10/16/95
Kansas City	Completed	9/5/95-10/16/95
El Paso	Completed	9/5/95-10/16/95

12.0 ADMINISTRATION.

12.1 Acquisition Program Summary. The procurement of TDLS services is under the FAA's Blanket Delegation of Procurement Authority (DPA0) for Telecommunication Services and is a Sole Source contract.

12.1.1 Market Survey. Not applicable for TDLS. A market survey is being done for D-ATIS voicing capability and results will be identified prior to beginning OT&E of D-ATIS.

12.1.2 Acquisition Strategy. The TDLS Program has been designated a "Fast Track" program and is meant to be a lead program in applying accelerated acquisition strategies. The TDLS Program continues the Non-Development Item (NDI) acquistition strategy to apply Commercial Off-The Shelf (COTS) hardware and technology to reduce program risk. A sole source contract has been awarded to ARINC for the purchase of hardware, software, development, testing, and deployment of TDLS to 57 sites. TDLS will be a Contractor Maintenance Logistics Support (CMLS) program throughout its projected life cycle.

12.1.2.1 Status of the Acquisition Process to Date. PDC services are post KDP-4. KDP-4 for PDC/TDLS FDIO CRT/RANK emulation is planned during the next year. D-ATIS will follow in approximately one year.

12.2 Contracting Information. There are three contractual activities that pertain to the TDLS program:

a. DITCO contract (DCA200-90-C-0058) with ARINC which provides for PDC services support until PDC sites are transitioned to TDLS sites.

b. TDLS contract with ARINC to complete TDLS development, testing and implementation (DTFA01-94-C-00053).

c. Modification to the DITCO contract (DCA200-90-C-0058) to include the TDLS post-implementation CMLS SOW.

12.2.1 Prime Contract. The prime contractor for all three contractual activities listed in 12.2, is ARINC of Annapolis, MD.

12.2.2 Service Contracts. The contracts with ARINC include development, testing, implementation, and maintenance and support services. Contractor name and address is as follows:

ARINC
2551 Riva Road
Annapolis, MD 21401

12.2.3 Program Support Contracts.

System Flow Inc. (SFI)
3204 Tower Oaks Blvd.
Suite 300
Rockville, MD 20852

Information Systems & Networks Corp. (ISN)
10411 Motor City Drive
Bethesda, MD 20817

ADSYSTECH, Inc.
8401 Colesville Rd.
Suite 450
Silver Springs, MD 20910

NISC
1280 Maryland Ave. S.W.
Suite 580
Washington D.C. 20024

12.2.4 Regional Contracting. Not applicable.

12.2.5 GFP/GFI/GFE Obligations. Equipment and plans procured under the development contract will be provided as GFP or GFI for the life-cycle TDLS CMLS contract. AND-310 is responsible for meeting this obligation.

12.3 Program Management (PM). The PM organizational structure is comprised of all the Headquarters and Regional APMs and their staff. It comprises the core element of the Integrated Product Team that has been established by AND-310. The objectives of the PM for the implementation of the TDLS program are as follows:

1. Responsibility for the acquisition, deployment, testing, evaluation and introduction of the TDLS into the NAS.

2. Develop TDLS program documentation, including the Program Master Plan (PMP) and Acquisition Plan, and approve the PIP.

3. Develop and support the TDLS program and F&E budget justification documentation.

4. Control TDLS program funds within approved appropriation.

5. Manage the TDLS program within approved cost, schedule, and technical baselines.

6. Inform management of program status, issues and accomplishments.

7. Plan and implement the transition from F&E to OPS.

8. Present Procurement Readiness Review (PRR), DRR, Project Status Review Board (PSRB), and Major Acquisition Reviews (MAR) briefings.

9. Determine acquisition and deployment strategies in coordination with applicable FAA organizations.

10. Establish the PM team structure and guidelines.

11. Obtain all necessary program approvals.

12. Develop and maintain agreements with other organizations and formally document them, if required.

13. Hold associate PMs accountable for accomplishments in accordance with directive agreement.

14. Ensure quality of all program documentation.

15. Acquire resources to accomplish the TDLS program and elevate

resource shortfall problems.

16. Act as TDLS advocate, serve as focal point and agency spokesperson for the TDLS program.

17. Approve the ILSP based on the recommendation of the APML.

12.3.1 PM Charter. AND-310 is tasked with procuring telecommunications equipment, services and support. AND-310 is anticipating deleting the PM Charter in favor of a Interfacility Communications IPT charter with AOA-1.

12.3.2 Program Management Team (PMT). The IPT Leader for Integrated Product Team For Communications (AND-300) has designated AND-310 to serve as Team Leader for the TDLS program. AND-310 is a component of the AND-300 IPT For Communications which supports TDLS implementation. The AND-300 IPT Plan sets forth the conceptual framework of this matrix. A list of IPT members' names, routing symbols, roles and telephone numbers is provided in Table 12-1.

12.3.2.1 Associate Program Manager for Engineering (APME). Son Tran, AND-310, is the TDLS APME. The APME directs, manages and accomplishes engineering activities to support the acquisition, ensures the quality and technical integrity of assigned projects, and accomplishes the necessary personnel management actions to accomplish the TDLS project. Duties may include, but are not limited to, the following:

1. Serves as the Contracting Officer's Technical Representative (COTR) for the TDLS contracts.

2. Responsible for management negotiations and accomplishment of the TDLS program.

3. Responsible for quality and technical integrity of the TDLS project.

4. Serves as first-line technical advocate for the TDLS project.

5. Responsible for providing technical guidance to the TDLS PM.

6. Primary technical interface for TDLS program with other FAA organizations.

7. Responsible for technical management of the prime contract and technical assistance contracts.

8. Responsible for the development/integration of technical portions of TDLS documentation with inputs from other APMs.

9. Prepares, analyzes and distributes scheduling information to all cognizant parties.

10. Provides planning and guidance to all activities whose systems or circuits will migrate to the TDLS.

11. Provides site preparation requirements to the regions and FAATC for monitoring the accomplishments of site activities leading toward the completion and acceptance of site installations.

12. Provides configuration management support for the TDLS.

13. Coordinates with the regions for scheduling and monitoring

installation.

14. Ensures the availability of all hardware and software for TDLS implementation.

15. Assists in the development of system operational cutover plans with ATR-100 and the regions.

16. Resolves all issues emanating from the installation, checkout, and integration of TDLS into the NAS.

12.3.2.2 COTR. Son Tran, AND-310, is the designated TDLS COTR on the TDLS contract. The COTR is responsible for all aspects of design, production, testing, delivery, installation, NAS integration and management of the TDLS contract. The COTR is also responsible for field implementation and will maintain close liaison with the regional representatives and the ARINC's installation teams.

12.3.2.3 COTR. Greg Strier, ALM-700, is designated TDLS COTR for the TDLS post implementation CMLS SOW which will be incorporated into a modification to the DITCO contract (DCA200-90-C-0058). The TDLS CMLS COTR is responsible for all aspects of post-implementation life-cycle CMLS management and contract administration.

12.3.3 Program Status Reporting. AND-310, the TDLS PM, will provide program progress and direction with input from members of the IPT and the Regions.

12.3.3.1 Program Director Status Review (PDSR). This has been replaced by a quarterly briefing to the Integrated Product Advisory Team (IPAT).

12.3.3.2 Major Acquisition Review (MAR). TDLS has been integrated into the AND-310 ADL MAR.

12.3.3.3 Deployment Readiness Review (DRR). Prior to the establishment of the IPT, the ARD PM and ALM-200A (formerly AAF-11) developed the tailored TDLS DRR checklist and conducted monthly status reviews of the DRR Action Items. This continued until October, 1993, when the TDLS program was delayed pending development of contract(s) with ARINC to complete development, testing, implementation, and provide life-cycle TDLS CMLS. With the signing of the TDLS development, testing, and implementation contract on September 9, 1994, and with the transition of program management responsibilities from ARD-270 to AND-310, the DRR Team will be re-established to revalidate the TDLS DRR checklist action items and add or subtract action items as appropriate. The AND-310 IPT will then coordinate tracking and resolution of the TDLS DRR Checklist Action Items with ALM-200A maintaining the data base.

12.3.3.4 NAILSMT Provisioning Conference. Not applicable.

12.3.3.5 Program Management Focus (PMF). Quarterly, TDLS APME briefs AND-310 and the IPT on the current status of TDLS implementation and funding as required and specific issues for resolution.

12.3.3.6 Program Manager's Review (PMR). TDLS APME briefs AND-310 and IPT on the current status of TDLS implementation and funding as required.

12.3.3.7 DRR EXCOM Briefing. AND-310 will present TDLS program status to the DRR EXCOM (date to be supplied) to seek a deployment decision on the "end-state" implementation.

12.3.4 Exception Management. Management by exception is a management concept in which an issue is only elevated after every effort has been made to resolve the concern within the PM's authority and resources. Technical, implementation, and transition issues that can not be resolved by the TDLS PM will be identified and presented during scheduled IPT reviews.

12.4 Quality Assurance (QA). ARINC will be held responsible for the quality of their products and services by the provisions of contract number DTFA01-94-C-00053. This includes the government's right to reject or return defective items for repair or replacement by the use of warranties, if applicable. The government will not reimburse ARINC for QA related costs.

12.4.1 Program Acceptance Criteria. ARINC shall conduct acceptance testing for the FAA at the FAATC in an integrated NAS environment. Acceptance tests shall be conducted on the complete set of hardware and software, including all applicable interfaces as specified in the Interface Requirements Specification (IRS), for all contractor developed software enhancements and modifications.

Test shall include: (a) functional tests to verify that the requirements specified in the System Segment Specification (SSS) are met; (b) end-to-end system performance tests, including capacity and response time, and system accuracy; (c) failure and recovery tests; (d) support and training function tests; (e) system security; (f) site adaption verification; and (g) transition tests.

12.4.2 Risk Management. There are no known risks.

12.5 Configuration Management (CM). TDLS is a commercial system for which configuration will be controlled and maintained during acquisition and implementation.

12.5.1 CM Responsibilities. During the acquisition phase, the TDLS configuration will be controlled and maintained by ARINC as required by the terms of the contract. ARINC is required to establish, implement, and maintain a CM program in accordance with FAA-STD-021, Configuration Management, and documented in a Configuration Management Plan. ARINC will establish a Configuration Change Board (CCB) to establish baselines and support baseline management. ARINC will submit Engineering Change Proposals (ECP) to the Contracting Officer for proposed changes to configuration items. Configuration items are to be systematically identified and marked; ARINC will prepare Configuration Item Development records for each item. Configuration Status Accounting (CSA) Reports will be provided to the FAA. ARINC will develop a Configuration Audit Plan and conduct configuration audits on all delivered hardware, software, and documentation. AND-310 is responsible for monitoring ARINC's CM program during the life of the contract.

12.5.2 Configuration Control Boards (CCB). The ANC CCB controls the establishment of and changes to the hardware and software baselines during the acquisition phase. For TDLS matters, the CCB will include members from IPT. The CCB is responsible for ensuring the functional, performance and interface requirements allocated to the TDLS hardware and software subsystems are reflected in the baseline documentation, and is responsible for controlling any changes to that documentation. The CCB retains this CM responsibility until the last ORD.

As a prerequisite to establishing the Product Baseline, the FAA will conduct the Functional Configuration Inspection (FCI) and Physical Configuration Inspection (PCI) with ARINC participation. Upon successful completion of the FCI and PCI, AND-310 will initiate a case file for the TDLS Product Baseline in accordance with FAA Order 1800.8E, National Airspace System Configuration

Management, for approval by the CCB.

12.5.3 CM Milestones. The CM responsibility associated with TDLS software will transition from ANC to ALM-100 after the last ORD. Subsequently, approval authority of all hardware NAS Change Proposal (NCP) activity will transition from the ANC CCB to the Maintenance Engineering (ME) CCB and all software NCP activity to the Air Traffic (AT) CCB. A hand-off package for TDLS will be prepared by AND-310 consisting of all hardware, technical and provisioning documentation, all software media, and all supporting documentation and site installation documentation.

During the operational support phase, and for the entire life-cycle of the implemented TDLS hardware and software, CM functions will consist of maintenance and change control management to ensure the integrity of the approved Product Baseline.

12.5.4 Configuration Items (CI). Configuration items will be provided prior to national deployment.

12.6-12.19 (Reserved)

12.20 Risk Assessment. There are no known program management risks associated with TDLS implementation.

Table 12-1 TDLS Program Management Team/Integrated Product Team

Name	Code	Telephone #	FAX #
Program Office			
Hugh McLaurin	AND-310,TL	202-287-7185	x2700
Derek Bigelow	AND-310	202-287-7186	x2700
TDLS APMs			
Son Tran	AND-310, APME	202-287-7172	
George Lampron	ACW-530, APMT	609-485-4806	
Greg Strier	ALM-700, APML	202-287-7014	
Cecil Croy	AMA-424	405-954-4924	
Dave Grogan	AML-200	405-954-5319	
Frank Baron	AOP-400	202-267-3753	
Terence Wendel	ASD-120	202-287-8627	
Michelle Brune	ASU-330B	202-287-7013	x5149
C.R. Bramble	ATP-120	202-267-9343	
Dan Strawbridge	ATR-120	202-267-9749	
Larry Williams	AOS-320	609-485-5211	
Clarissa Riffe	ANS-210, APMNI/NISC	202-651-3098	x3140

13.0 IMPLEMENTATION (REQUIREMENTS)

13.1 Implementation Support Organization.

13.1.1 Associate Program Manager for NAS Implementation (APMNI). The ANS-210 office assigned Clarissa Riffe as the APMNI for TDLS. The APMNI is a member of the IPT. The APMNI is responsible for developing and coordinating the PIP and the Generic Site Implementation Plan (GSIP); coordinating and tracking implementation and transition issues through the Transition Information Exchange (TIE) process; reviewing contractor developed implementation plans, procedures and reports, and tracking the status of program exit criteria related to implementation.

13.1.2 Implementation Team (IMT). The IMT is comprised of the IPT which will participate, along with the Regional Associate Program Managers (RAPM), in the coordination of the TDLS PIP and the GSIP and support identification and resolution of implementation issues through the TIE process. The members of the IPT core team are listed in Table 12-1. RAPMs are listed in the following paragraph.

13.1.3 Regional Associate Program Manager (RAPM). The RAPM is part of the IPT team and is the point of contact for implementation issues within their respective regions. The following are the RAPMs supporting the TDLS project:

AGL	Rick Murphy	AGL-421.3	708-294-7590
AEA	Ed Salvesen	AEA-421.4	718-553-1176
AWP	Gary Pettengill	AWP-422.23	310-297-1425
ANE	Bob Manning	ANE-422BM	617-238-7434
ASO	Terri Simpson	ASO-420A	404-305-6294
AAL	Jerry Jensen	AAL-452	907-271-3840
ACE	Scott Lueckert	ACE-424L	816-426-3601
ANM	Bob Rollins	ANM-422	206-227-2425
ASW	Ana Gonzales	ASW-421.3	817-222-4213

13.1.4 Technical On-Site Representatives (TOR). The Regions will identify the TOR prior to site implementation.

13.1.5 Contract Support. The list of contract support is provided in paragraph 12.2.3.

13.2 Site Implementation Process. The following subparagraphs summarize the specific transitory requirements needed to accomplish TDLS implementation activities during each site implementation phase. Note: The TDLS program is a Service procurement, which includes acquisition of COTS/NDI hardware, therefore, not all implementation processes are applicable. The following requirements have been modified to reflect this.

13.2.1 Implementation Planning Phase.

13.2.1.1 Implementation Activities. The following site activities require implementation planning and coordination: site surveys, FAA site preparation, TDLS Program Office funding support for FAA site preparation, TDLS system installation and testing by ARINC, and the removal of the tower cab FDIO CRT and RANK.

13.2.1.2 Requirements. The TDLS program office will notify/coordinate with the TDLS RAPM for establishing the dates for the site survey and TDLS installation. The TDLS program will coordinate with the Regional F&E regarding FAA site preparation at the TDLS sites.

The program office will fund all TDLS equipment, installation at fifty seven sites, installation of one local phone line per site (additional 27 sites only), and the first full fiscal year past the date of commissioning for maintenance on each system. Project Authorizations of approximately $5,000 for each tower has been sent to each region for all sites. These funds are to be used for F&E engineering to run two ethernet cables from the equipment room to the cab and other costs associated with TDLS installation.

13.2.2 Pre-Installation and Checkout (Pre-INCO). Site activities will include the following:

13.2.2.1 Implementation Activities.

1. Delivery Order Preparation. The TDLS program office will coordinate TDLS requirements and funding arrangements with the affected regional management prior to issuing delivery orders. At a minimum this coordination will address; equipment to be installed and spares requirements; site preparation requirements to include the estimated cost and time to complete; and the installation dates for each site.

2. Site Surveys. ARINC will require access to various FAA sites to perform site surveys as required to perform work authorized on the Installation Delivery Orders. At the completion of any site survey ARINC will identify any significant items that would impact the TDLS equipment installation efforts and discuss, with the site manager, procedures ARINC will follow during the installation at the site. A formal site survey report will be prepared for each site and mailed to the respective regions for concurrence.

3. FAA Organizations. The respective FAA site manager will be responsible for ensuring that the requisite site preparations are completed on schedule.

4. Delivery. All TDLS equipment will be stored at ARINC locations until installed at the towers. Non-installed TDLS equipment will become the initial LRU spares and will be dispersed at ARINC field service centers in accordance with ARINC's sparing plan that is included in ARINC's Maintenance Plan approved by the FAA.

13.2.2.2 Requirements. Regional and local FAA personnel will perform the following site preparation activities.

1. Provide guidance and assistance to the service provider during site survey activities.

2. Establish a configuration baseline for each site which satisfies floor space, location, and power requirements.

3. Prepare site plans and procedures necessary to receive and support the installation of the TDLS terminals.

4. Perform site preparation as identified in the site survey report including site engineering and planning, update facility documentation, drill holes through operations floor and walls for cable routing and install AC power and grounding required to support the new equipment.

5. Support ARINC during installation, e.g., coordinating with ARINC installation and integration activities and escorting ARINC to and from the installation site.

13.2.3 Installation and Checkout (INCO).

13.2.3.1 Implementation Activities. A series of factory and installation tests will be performed by ARINC.

1. The proper operation of all X-Window terminals will be verified by ARINC at the ARINC facilities before installation at the tower. NCD personnel will repair or replace all non-functioning equipment.

2. Testing of the installed equipment to verify that integrated hardware and software meet specified functional and operational performance at each site.

3. Verify that required support items such as support manuals are available, technically compatible and in compliance with the contract requirements.

13.2.3.2 Requirements. The onsite TOR will provide verification that the TDLS equipment installation is satisfactory. The site manager will verify and approve the TDLS equipment installation once checkout has been successfully completed.

13.2.4 System Integration.

13.2.4.1 Implementation Activities. ARINC Maintenance Service (AMS) and Field Engineering (FE) personnel shall complete the installation checklist after the systems are installed to determine that all components of the system are operating properly. Integration testing will be performed at each site after installation. This will demonstrate that the TDLS equipment meets its functional and system-level performance requirements, has been integrated as specified and can interface and operate with specified external systems/subsystems. These external systems/subsystems will include the line to the FDIO RCU FSP tap, FDIO RANK and CRT connections, weather source connection, DMN, NADIN II, and the ADNS connection.

13.2.4.2 Requirements. Not Applicable

13.2.5 Field Shakedown.

13.2.5.1 Implementation Activities. Subsequent to a deployment decision, it is anticipated that each system will undergo some field shakedown testing at individual deployment sites. Regional personnel shall conduct field shakedown test & evaluation at each field site prior to commissioning. The field shakedown test will be a subset of the first site OT&E/shakedown.

13.2.5.2 Requirements. Not applicable.

13.2.6 Dual Operations.

13.2.6.1 Implementation Activities. This phase follows completion of the ORD milestone through commissioning of the system for on-going operations through completion of the Joint Acceptance Inspection (JAI). During this interval, the system is commissioned and pre-determined minimum number of personnel are certified on use of the system. The replaced system is not available in back-up mode. The Dual Operations phase will not be applicable to all acquisition programs. (Ref: Implementation Process Guidelines, dated June, 1994, page 19).

After TDLS equipment is commissioned, there will be no equipment requiring decommissioning.

13.2.6.2 Requirements. The JAI is an activity to gain consensus of all involved that projects for facility establishment, improvement, or relocation are completed in accordance with national criteria, and that the facility is capable of performing its advertised functions.

Pre-JAI Activities: Once the specified construction and/or installation work has been completed, the on-site engineer notifies the sector and the AF planning office by phone and or memorandum. A JAI shall be performed before a new, improved, or relocated facility, system, or equipment is accepted for maintenance and/or operation on a commissioned basis in the NAS. The regional AF division is responsible for notifying the joint acceptance board chairperson when the facility will be ready for the JAI. (Ref: FAA Order 4650.30 dated 5/4/93, page 5-2 and Appendix 2, page 3).

13.2.7 Equipment Removal.

13.2.7.1 Implementation Activities. Disposition of the FDIO CRT and RANK removed from each tower during TDLS installation will be determined prior to TDLS implementation. The PDC tower AT&T 705 monitors and keyboards are required to be removed after the TDLS system is operational and returned to ARINC. ARINC will temporarily keep the removed PDC terminals at their field service offices for reinstallation in the event of a catastrophic TDLS failure. The 10Mhz Starlan network access board and internal 2400 modem inside each of the TDLS workstations will be returned to the FAA. ARINC will dispose of any TDLS GFE as directed by the Contracting Officer.

13.2.7.2 Requirements. Not applicable.

13.3 Site Implementation Milestones. See Table 11-1, Site Survey and Implementation Schedule. D-ATIS implementation milestones will be added after D-ATIS OT&E.

13.4-13.19 (Reserved)

13.20 Risk Assessment. Regions ability to complete site preparation due to limited F&E resources and the lack of DMN at each site will be implementation risks. If DMN is not available, AOP-400 will be responsible for providing a suitable substitute. There are no other known site implementation risks associated with the TDLS implementation organization and transitory requirements.

APPENDIX A

GENERIC SITE IMPLEMENTATION PLAN (GSIP)

(To Be Provided NLT March 31, 1995)

APPENDIX B

TRANSITION INFORMATION EXCHANGE (TIE) SUMMARY REPORT

(TBS after site surveys have been completed.)

APPENDIX C

ACRONYMS

ACARS	Aircraft Communications Addressing and Reporting System
ADF	Aviation Digital Forecast
ADL	Aeronautical Data Link
ADNS	ARINC Data Network Service
AF	Airway Facilities
AFS	Airway Facilities Sector
AFTN	Aeronautical Fixed Telecommunications Network
AMP	ARINC Message Processors
AMS	ARINC Maintenance Service
ANSI	American National Standards Institute
APME	Associate Program Manager for Engineering
APMNI	Associate Program Manager for NAS Implementation
APML	Associate Program Manager for Logistics
APMT	Associate Program Manager for Test
APS	ARINC Packet Switches
ARINC	Aeronautical Radio Incorporated
ARTCC	Air Route Traffic Control Center
ASOS	Automated Surface Observing System
AT	Air Traffic
ATC	Air Traffic Control
ATCT	Airport Traffic Control Tower
ATIS	Automatic Terminal Information Service
ATN	Aeronautical Telecommunication Network
AVG	Automatic Voice Generation
AWDS	Automated Weather Distribution System
AWIS	Airport Weather Information System
BWI	Baltimore-Washington International Airport
CAI	Contractor Acceptance Inspection
CCB	Configuration Control Board
CD	Clearance Delivery
CDRL	Contract Data Requirements List
CHI	Computer Human Interface
CM	Configuration Management
CMS	Communications Management System
CRT	Cathode Ray Tube
CSA	Configuration Status Accounting
DT&E	Development Test and Evaluation
D-ATIS	Digital ATIS
DITCO	Defense Information Technology Contracting Office
DMN	Data Multiplexing Network
DFW	Dallas-Ft. Worth Airport
DPA	Delegation of Procurement Authority
DRR	Deployment Readiness Review
ECP	Engineering Change Proposal
EXCOM	Executive Committee
FAA	Federal Aviation Administration
FAATC	FAA Technical Center
FCI	Functional Configuration Inspection
FDIO	Flight Data Input Output
FE	Field Engineering
FRDF	Facility Reference Data File
FSP	Flight Strip Printer
GCC	Ground Cluster Controllers
ILSP	Integrated Logistic Support Plan
INCO	Installation and Checkout
ISP	Integrated Support Plan

ICAO	International Civil Aviation Organization
I/O	Input/Output
JAB	Joint Acceptance Board
JAI	Joint Acceptance Inspection
LAN	Local Area Network
LID	Location Identification
LINCS	Leased Interfacility NAS Communications System
LRU	Line Replaceable Unit
MB	Megabyte
ME	Maintenance Engineering
MORT	Mean Onsite Response Time
MPS	Message Preparation Support
MRD	Maintenance Requirements Document
MT	Manager For Test
MTP	Master Test Plan
MTTRS	Mean Time To Repair Service
MWL	Message Waiting Light
NADIN	National Airspace Data Interchange Network
NAILS	National Airspace Integrated Logistics Support
NAILSMT	National Airspace Integrated Logistics Support Management Team
NAS	National Airspace System
NCD	Network Computing Devices
NCP	NAS Change Proposal
NCS	Network Control System
NOTAM	Notice to Airmen
OATS	Office Automation Technology and Service
OCD	Operation Capabilities Demonstration
ORD	Chicago O'Hare Airport
ORD	Operational Readiness Demonstration
OT&E	Operational Test & Evaluation
PA	Project Authorization
PC	Personal Computer
PCI	Physical Configuration Inspection
PDC	Pre-Departure Clearance
PIP	Program Implementation Plan
PRE-INCO	Pre-Installation and Checkout
RALA	Registered Automatic Line Adapter
RANK	Replacement Alphanumeric Keyboard
RCL	Radio Communications Link
RCU	Remote Control Unit
SA-IDS	Systems Atlanta Information Display System
SAO	Surface Aviation Observation
SITA	Societe Internationale de Telecommunications Aeronautiques
SEI	System Engineering and Integration
SET	Software Engineering Test
SFO	San Francisco Airport
SMO	System Management Organization
SSS	System/Segment Specification
TDLS	Tower Data Link Services
TOR	Technical Officer Representative
TPC	Tower Position Console
TPRC	Test Plans Review Committee
TRR	Test Readiness Review
UPS	Uninterruptable Power Supply
VDS	Visual Display System
VHF	Very High Frequency
VSU-CP	
WSSM	Workstation Selector Module

APPENDIX D

APPLICABLE DOCUMENTS

DOCUMENT NUMBER	DOCUMENT TITLE
DTFA01-94-C-00053	FAA/ARINC Contract
DCA200-90-C-0058	DITCO/ARINC Contract
FAA-STD-036B	Preparation of Program Implementation Plans dated 5/10/94
MIL-STD-794, Appendix E	Procedures for Packaging of Parts and Equipment dated 7/16/82
MIL-E-17555H	Electrostatic Discharge Sensitive Items dated 11/15/84
MIL-STD-973	Configuration Management dated 4/17/92
MIL-STD-973	Configuration Management, Interim Notice 1 dated 12/1/92
MIL-STD-1388.1A	Logistics Support Analysis dated 3/28/91
MIL-STD-1388.2B	DoD Requirements for a Logistic Support Analysis Record dated 3/28/91
MIL-STD-1521B	Technical Reviews and Audits for Systems, Equipments, and Computer Software dated 12/19/85
FAA Order 1200.22B	Use of National Airspace System (NAS) Computer and Radar Data or Equipment by Outside Interests dated 4/14/93
FAA Order 1600.54B	FAA Automated Information Systems Security Handbook dated 2/7/89
FAA Order 1810.4B	FAA NAS Test and Evaluation Policy dated 10/22/92
FAA Order 1810.6	Policy for use of Nondevelopmental Items in FAA Acquisitions dated 11/13/92
FAA Order 1800.58A	National Airspace Integrated Logistics Support Policy dated 8/19/93
FAA Order 1800.63A	National Air Space Deployment Readiness Review Program dated 1/19/93
FAA Order 4453.1B	Quality Assurance of Material Procured by FAA dated 1/17/92
FAA Order 4650.7A	Management of NAS F&E Project Material dated 5/22/91
FAA Order 4650.21B	Management and Control of In-Use Personal Property, change 2, dated 11/5/90
FAA Order 4650.30	Management and Control of NAS F&E Project Material dated 5/4/93

FAA Order 6000.30B	Policy for Maintenance of the National Airspace System Through the Year 2000 dated 10/8/91
FAA Order 6030.31E	Restoration of Operational Facilities dated 11/4/92
FAA Order 6030.45A	Facility Reference Data File dated 12/92
FAA Order 6032.1A	Modifications to Ground Facilities, Systems, And Equipment in the National Airspace System dated 9/25/75
FAA Order 6032.1A	Modifications to Ground Facilities, Systems, And Equipment in the National Airspace System, Supplement 4 dated 2/26/92
FAA Order 7032.11	Air Traffic Operational Requirements for the Pre-Departure Clearance System dated 12/9/91
FAA Order 7032.13	Air Traffic Requirements for the Digital Automatic Terminal Information Service (ATIS) System dated 4/19/93
FAA-STD-019B	Lightning Protection, Grounding, Bonding, and Shielding Requirements for Facilities dated 8/28/90
FAA-STD-020B	Transient Lighting Protection, Grounding, Bonding, and Shielding Requirements for Equipment dated 5/11/85
FAA-STD-024A	Preparation of Test and Evaluation Documentation dated 8/17/87
FAA-STD-025C	Preparation of Interface Control Documentation dated 12/10/92
FAA-STD-026	National Airspace System Software Development dated 3/31/89
FAA-STD-028A	Contract Training Programs updated
NAS-SR-1000	NAS System Requirements Specification Change 10 dated 11/27/91
N/A	TDLS Maintenance Requirements Document (MRD) dated 4/23/94
N/A	Phase II Pre-Departure Clearance Enhancement Requirements, Memorandum dated 12/19/91
N/A	Air Traffic Requirements for Tower Data Link Services (TDLS) and Pre-Departure (PDC) Phase II Development and Support, Memorandum dated 11/29/93
N/A	Digital Automatic Terminal Information Service (D-ATIS) Requirements, Memorandum dated 9/17/93
N/A	Tower Data Link Services (TDLS) Digital Automatic Terminal Information Service (D-ATIS) Requirements, Memorandum dated 12/3/93
N/A	Digital Automatic Terminal Information Service (ATIS) Enhancement, Memorandum dated 1/26/93

N/A	Phase II PDC/FDIO Integration Requirements, Memorandum dated 6/24/92
N/A	Requirement for Additional Pre-Departure Clearance (PDC) Locations, Memorandum dated 1/14/92
N/A	Tower Data Link Services (D-ATIS) Requirement for Incorporation of Meteorological Aviation Report (METAR) Format Memorandum dated 5/19/94
N/A	Functional Requirements for the Addition of Automatic Voice Generation to D-ATIS dated 5/12/94
N/A	Digital Automatic Terminal Information Service (ATIS) Requirements for Field Evaluation dated 7/8/92
N/A	Tower Data Link Services (TDLS) Keyboard Layout, Memorandum dated 12/15/93
N/A	Digital Automatic Terminal Information Service (D-ATIS) Automatic Voice Generation (AVG) Memorandum dated 2/18/94
N/A	Requirement for Additional Pre-Departure Clearance (PDC) Locations, Memorandum dated 12/6/93
N/A	Tower Data Link Services (TDLS) Flight Data Input/Output (FDIO) Automatic Log-In Requirement, Memorandum dated 3/23/94
N/A	FDIO Site Technical Bulletin (STB) dated
N/A	ARINC TDLS Operator User Manual dated
N/A	ARINC TDLS System Administrator User Manual dated
N/A	ARINC TDLS Master Test Plan dated
N/A	ARINC TDLS Site Acceptance Plan dated
N/A	ARINC TDLS Maintenance Plan dated
Harris 176514c	NADIN Packet Switch Network (PSN) x.25 Packet Mode Users Interface Control Document, Revision C dated 7/9/91